ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

ΠΑΡΟΥΣΙΑΣΗ ΜΕΤΑΠΤΥΧΙΑΚΗΣ ΔΙΠΛΩΜΑΤΙΚΗΣ ΕΡΓΑΣΙΑΣ

Τίτλος

«Biodegradable Polyesters with Upper Critical Solution Temperature (UCST) Behavior in Aqueous Salt Solutions»

της Μαρίας Καρούζου, μεταπτυχιακής φοιτήτριας του

Τμήματος Επιστήμης και Τεχνολογίας Υλικών του Πανεπιστημίου Κρήτης

Επιβλέπουσα καθηγήτρια: Μαρία Βαμβακάκη

Δευτέρα 24/01/2022

11:00

Η παρουσίαση θα πραγματοποιηθεί στην **αίθουσα Β2 του Τμήματος Χημείας,** του Πανεπιστημίου Κρήτης.

ABSTRACT

Thermo-responsive polymers are classified into two main types, those which exhibit a lower critical solution temperature (LCST) and polymers with an upper critical solution temperature (UCST). UCST polymers are much less studied compared to their LCST counterparts, whereas UCST-type biodegradable polymers are scarce in literature.

In this study, we have synthesized main chain biodegradable polyesters bearing ionizable primary amine side groups, which exhibit an UCST in water in the presence of hydrophobic counterions. The polymers were synthesized by the polycondensation of a vinyl functionalized diol with a diacid chloride, followed by the post-polymerization modification of the alkene side groups of the polymer with cysteamine hydrochloride. In the first part of the thesis, functional polyester homopolymers exhibiting pH-responsive properties in aqueous solution and a thermo-responsive behavior in the presence of tetrafluoroborate anions, which act as counterions to the charged amine groups, were prepared.

In the second part of the work, functional poly(ethylene glycol)-*b*-polyester (PEG-*b*-polyester) diblock copolymers were synthesized via a Steglich esterification reaction.

Thermo-responsive diblock copolymers were obtained following the post-polymerization modification of the alkene side groups of the copolymer with cysteamine hydrochloride. After anion exchange with tetrafluoroborate anions, the thermo-responsive diblock copolymers self-assembled into spherical micelles in water at room temperature. The encapsulation and release of a hydrophobic dye from the micelles, as a function of the solution temperature, was investigated.

Overall, the tunable transition temperature and excellent biodegradability of these polyesters render them promising biomaterials for use in drug delivery and tissue engineering applications.